Office Action Summary	Application No.	Applicant(s)	
	10/824,383	MATSUSAKA, HIROMI	
	Examiner	Art Unit	
	ZHIYU LU	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-5 and 7-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-5 and 7-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/03/2008 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 2-5 and 7-10 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 2-3, 5 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff (US Patent#6373888) in view of Lindoff et al. (US Patent#6463107), Jayaraman et al. (US2003/0087622), and Whikehart et al. (US Patent#6178211).

Regarding claim 2, Lindoff teaches a radio reception apparatus comprising:

a receiver (401 of Fig. 4) configured to receive a signal on a per time unit basis (inherent in TDMA system, where processing is on a per time unit basis), the received signal including a known signal pattern on a predetermined per time unit basis (402 of Fig. 4);

an adjuster (405 & 407 of Fig. 4) configured to adjust a filter for filtering the received signal using the known signal pattern on a per time unit basis (406 of Fig. 4); and

a canceller (406 of Fig. 4) configured to cancel an interference component included in the time unit using the adjusted filter (3 of Fig. 2);

wherein the adjuster comprises:

a tap coefficient controller configured to set the filter according to the estimated channel structure (column 5 lines 50-51).

But, Lindoff does not expressly disclose the interference component comprising adjacent channel interference and inter-symbol interference; a modulation scheme determiner configured to process likelihoods calculated for individual modulation schemes and to determine the modulation using the known signal pattern; an interference level detector configured to compare signal levels, which correspond to a plurality of frequencies obtained from a result of a frequency analysis, to a predetermined threshold value, which is updated per time unit, and to detect locations and levels of adjacent channel interference; and the tap coefficient controller setting the filter according to the determined modulation scheme, wherein the adjusted filter is adjusted based on the determined modulation scheme of the modulation scheme determiner.

Lindoff et al. teach a modulation scheme determiner configured to process likehoods calculated for individual modulation schemes and to determine the modulation using the known signal

pattern (column 3 lines 3-62); and control tap coefficients to set the filter according to the determined modulation scheme (column 4 lines 41-49).

Jayaraman et al. teach having an adaptive filter and adaptive equalizer to reduce an interference component comprising adjacent channel interference (ACI) and inter-symbol interference (ISI) (paragraphs 0049, 0071).

Note that Lindoff's system is a digital TDMA system first of all, signal processing including filtering is inherently per time unit basis. If the receiver processes signal in continuous time, it's per time unit basis because it is TDMA. If the receiver processes signal in discrete time like digital signal, it's per time unit. Either way, filtering is per time unit basis. Both Lindoff and Lindoff et al. teach having digitizing communication and sampling received signal, which means it processes including filtering per time unit basis. Moreover, Jayaraman et al. teach having ADC (analog-to-digital filter) and using adaptive filter, which are known for processing sampled discrete-time signal.

Whikehart et al. teach a adaptive filter (Figs. 3-7) using an interference level detector to determine filter coefficients, where the interference level detector configured to compare signal levels, which correspond to a plurality of frequencies obtained from a result of a frequency analysis, to a predetermined threshold value, which is updated per time unit, and to detect locations and levels of adjacent channel interference (column 1 line 64 to column 2 line 23, where detected locations are obviously interpreted as neighboring areas, where adjacent channel interferences originate).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate modulation determiner and taking determined modulation type into tap

calculation taught by Lindoff et al. and adaptive filter, equalizer taught by Jayaraman et al., and interference level detector taught by Whikehart et al. into the radio reception apparatus of Lindoff, in order to obtain more information to refine tap coefficients determination process for more efficient interference cancellation or reduction with adaptive filtering components.

Regarding claim 3, Lindoff, Lindoff et al., and Whikehart et al. teach a radio reception apparatus as explained in response to claim 2 above.

But, Lindoff, Lindoff et al., and Whikehart et al. do not expressly disclose the interference component comprising adjacent channel interference and inter-symbol interference; a frequency converter configured to perform a frequency analysis of the received signal; and the tap coefficients are set according to a detection result of adjacent channel interference.

Jayaraman et al. teach a frequency converter configured to perform frequency analysis of the received signal before processing (paragraph 0028); and having an adaptive filter and adaptive equalizer to reduce an interference component comprising adjacent channel interference (ACI) and inter-symbol interference (ISI) (paragraphs 0049, 0071).

In view of Lindoff et al.'s teaching on setting tap coefficients of filter according to detected modulation scheme (column 4 lines 41-49) and noise power/interference level (column 7 lines 6-26) and Jayaraman et al. teach setting filter tap coefficients using detected adjacent channel interference result (Figs. 2-5, paragraphs 0011-0013), it would have been obvious to one of ordinary skill in the art to recognize and modify filter tap coefficients into based on both modulation type and adjacent channel interference level for further optimizing signal filtering process with more information on received signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate using detected adjacent channel interference result to set filter parameters taught by Jayaraman et al. into the radio reception apparatus of Lindoff, Lindoff et al., and Whikehart et al., in order to provide more information on received signal to refine signal filtering process.

Regarding claim 5, Lindoff, Lindoff et al., Jayaraman et al., and Whikehart et al. teach the limitation of claim 2.

In view of Lindoff et al.'s teaching on setting tap coefficients of filter according to detected modulation scheme (column 4 lines 41-49) and noise power/interference level (column 7 lines 6-26) and Jarayman et al. teach a plurality of filters having different filter characteristics (242 or 420 of Fig. 4), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the filter of Lindoff into a plurality of filter configured to be selected according to the determined modulation scheme.

Regarding claim 7, Lindoff, Lindoff et al., Jayaraman et al., Whikehart et al. teach the limitation of claim 2.

It would have been obvious to one of ordinary skill in the art to recognize Lindoff teaches wherein the adjuster adjusts a filter characteristic of the filter such that a combined characteristic of said filter with a baseband filter at a communicating partner station has a Nyquist characteristic because Nyquist characteristic is fundamental for signal reconstruction, which is essentially needed in sampling and signal processing.

Regarding claim 8, Lindoff, Lindoff et al., Jayaraman et al., Whikehart et al. teach the limitation of claim 2.
Lindoff teaches a communication terminal apparatus including the radio reception apparatus (column 4 lines 11-14).

Regarding claim 9, Lindoff, Lindoff et al., Jayaraman et al., Whikehart et al. teach the limitation of claim 2.
It would have been obvious to one of ordinary skill in the art to incorporate the radio reception apparatus in a base station apparatus (column 3 lines 61-64) for interference cancellation on received signals.

Regarding claim 10, Lindoff, Lindoff et al., Jayaraman et al., Whikehart et al. teach a reception filtering method as explained in response to claim 2 above.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff (US Patent#6373888) in view of Lindoff et al. (US Patent#6463107), Jayaraman et al. (US2003/0087622), Whikehart et al. (US Patent#6178211), and Baugh et al. (US Patent#5150379).
Regarding claim 4, Lindoff, Lindoff et al., and Whitehart et al. teach a radio reception apparatus as explained in response to claim 2 above, wherein Lindoff teaches a transmission path

characteristic estimator configured to estimate a transmission path characteristic (channel structure) using the known signal pattern included in the received signal from which interference is canceled (405 of Fig. 4)

But, Lindoff, Lindoff et al., and Whitehart et al. do not expressly disclose the interference component comprising adjacent channel interference and inter-symbol interference; an error measurer configured to measure an error of the received signal that occurs due to a transmission path characteristic by comparing the known signal pattern included in the received signal with a known signal pattern obtained by the transmission path characteristic; and a tap coefficient controller configured to control tap coefficients to set the filter based on the measured error and a reception level of the received signal.

Jayaraman et al. teach having an adjuster comprising of adaptive filter and adaptive equalizer to reduce or cancel an interference component comprising adjacent channel interference (ACI) and inter-symbol interference (ISI) (paragraphs 0049, 0071).

Baugh et al. teach adjusting tap coefficients for adaptive filter/equalizer based on measured and error (e) and measured signal level (S) (Fig. 3, column 4 line 63 to column 5 line 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate using adaptive adjuster to cancel adjacent channel interference and inter-symbol interference taught by Jayaraman et al. and adjusting tap coefficients based on measured error and reception level taught by Baugh et al. into the radio reception apparatus of Lindoff, Lindoff et al., and Whitehart et al., in order to provide information on received signal to refine signal filtering process.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZHIYU LU whose telephone number is (571)272-2837. The examiner can normally be reached on Weekdays: 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. L./
Examiner, Art Unit 2618

/Nay A. Maung/
Supervisory Patent Examiner, Art Unit 2618

Zhiyu Lu
August 7, 2008